REMARKS

In the patent application, claims 1, 2, 4, 5, 7-11, 13, 15-17, 20-25, 27, 31, 33-35 and 37 are pending.

In the office action, all pending claims are rejected.

At section 4 of the office action, claims 1, 2, 4, 5, 7-8, 13, 16-17, 20-22, 27, 31, 33-35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable by *Harumoto et al.* (U.S. Patent Application Publication No. 2002/0004840 A1, which has been published as Patent No. 7,016,970 B2, hereafter referred to as *Harumoto*), in view of *Colavito et al.* (U.S. Patent Application Publication No. 2003/0152094, hereafter referred to as *Colavito*), and further in view of *Radha et al.* (U.S. Patent No. 6,700,893, hereafter referred to as *Radha*).

In rejecting claim 1, the Examiner states that *Harumoto* discloses a method for receiving a packet stream. The Examiner admits that *Harumoto* fails to disclose estimating packet stream transfer delay variation indicative of a variation in time for transferring of the packet stream from the server to the client, but points to *Colavito* for disclosing an adaptive jitter buffer management system that updates the buffer threshold by calculating the average packet transit time over the network and uses that information to determine the jitter in the network in order to reduce playout delay and improve quality of service (Abstract; Figure 5, steps 506-512).

The Examiner further admits that *Harumoto*, in view of *Colavito*, fails to disclose that the client receives pre-decoder buffer parameters from the server. The Examiner points to *Radha* for disclosing that the client has a buffer controller that estimates delay, jitter and bandwidth of the network (col. 12, lines 20-23), and that the server (transmitter) sends the parameters to the client before the client estimates the buffer and delay so as to allow the client to compensate for variations in the network (col.2, lines 35-42).

Applicant respectfully disagrees.

It is respectfully submitted that, claim 1 includes the limitations of

receiving from the server pre-decoder buffering parameters to ensure that the client is able to play out the received packet stream without buffer violation when the packet stream is transmitted over a constant delay, reliable transmission channel;

estimating packet stream transfer delay variation indicative of a variation in time for transferring of the packet stream from the server to the client;

estimating parameters of a jitter buffer based on packet stream transfer delay variation; and

transmitting to the server information indicative of an aggregate of the pre-decoding buffering parameters and the jitter buffer.

A. Cited References Do Not Disclose Transmitting to the Server Information As Claimed

As claimed, claim 1 includes the limitation of transmitting to the server information indicative of an aggregate of the pre-decoding buffering parameters and the jitter buffer, wherein the parameters of the jitter buffer are estimated based on the packet stream transfer delay variation indicative of a variation in time for transferring of the packet stream from the server to the client, and the pre-decoding buffer parameters are received from the server.

A.1 The Cited *Harumoto* Reference

Harumoto is concerned with a method wherein the client (terminal) notifies a server of a target value and a delay time as determined by the client, allowing the server to control the transmission speed so that the buffer occupancy of the client changes in the vicinity of the target value without exceeding the target value. In particular, the target value (S_target) is the value of stream data to be stored in the receiver buffer determined based on the entire capacity of the buffer (col.11, lines 9-15). The parameter S_target generally varies with the type of the terminal in the client (col.11, lines 15-17). The delay time (T_delay) is indicative of the period between the time the client writes a head data of the stream data to the buffer, reads the data and starts decoding or playing (col. 11, lines 18-20; abstract).

Thus, *Harumoto* only discloses that the client notifies the server of a target value (value of stream data to be stored in the receiver buffer) and a delay time (period between the time the head data of the stream data is written to the buffer to the stream data is started to be decoded or playout).

A.2 The Cited *Colavito* Reference

Colavito discloses that playout delay is iteratively adjusted based on changing network traffic characteristics by varying the release threshold in a jitter buffer, and the adjustment is carried out by evaluating three quantities: 1) average packet transmit time over the network; 2) jitter of the packet transit time; and 3) additional waiting time due to the presence of out-of-sequence packets (Abstract;

paragraph [0009]). Specifically, the information that is sent to the server, according to *Colavito*, is the frame-release threshold value so that the server can determine when to send data packets to the decoder. The packet-based threshold value is updated based on three factors: 1) the current measures or estimates of the packet waiting time; 2) the variation measure; and 3) the out-of-sequence error (paragraph [0048]).

According to *Colavito*, the packet waiting time in the jitter buffer is defined as the amount of time between when a packet arrived at the jitter buffer and when the same packet was forwarded to the decoder for playout (paragraph [0043]). Thus, this packet waiting time in the jitter buffer is not the same as the packet stream transfer delay variation indicative of a variation in time for transferring of the packet stream from the server to the client.

The variation measure is a quantity representing variation of the packet waiting time in the jitter buffer (paragraph [0044]). In other words, it is a variation of the amount of time between when a packet arrived at the jitter buffer and when it was forwarded to the decoder for playout. Thus, this variation measure is also not the same as the packet stream transfer delay variation indicative of a variation in time for transferring of the packet stream from the server to the client.

The out-of-sequence error corresponds to the playout delay due to the presence of out-of-sequence packets. The claimed invention has nothing to do with out-of-sequence error.

Thus, *Colavita* only discloses that the client provides the frame-release threshold value to the server, wherein the threshold value is updated based on the current measures and the variation measures of the packet waiting time and the out-of-sequence error.

A.3 The Cited *Radha* Reference

Radha discloses a delay budget controller 138 for use with a decoder buffer that receives streaming data packets over a data network from a streaming transmitter. The delay budget controller includes 1) a first controller for monitoring one network parameter associated with the data network; and 2) a second controller for monitoring in the decoder buffer a delay budget region comprising a retransmission region and a late region (see Abstract). The delay budget controller 138 comprises a real-time QoS characterization circuit 505, a buffer management circuit 510 and a delay budget management circuit 515 (see Figure 5 and col. 11, lines 15-22). The real-time QoS characterization circuit 505 is used for calculating and updating round-trip delay, delay jitter and bandwidth (col.11, lines 49-52); the buffer management circuit 510 is used for identifying the minimum ideal start-up delay and the minimum total starting delay (col.12, lines 2-5). The buffer

management circuit 510 may also be used to calculate preliminary estimates for round-trip delay, delay jitter and bandwidth (col.12, lines 23-28); and the delay budget management circuit 515 is used to determine and manage the elapsed time needs for detecting and recovering lost packets through the re-transmitting process (col.12, lines 53-55). The network conditions (round-trip delay, delay jitter and bandwidth) and the delay parameters (minimum ideal start-up delay and the minimum total starting delay) are then used to calculate the probability that a video packet has actually been lost if a packet is not received after a minimum monitoring time (col.15, line 64 to col.16, line 17). Under a certain condition, the delay budget controller 138 transmits a re-transmission request to the streaming video transmitter 110 (Figure 6, step 625; col.16, lines 18-21).

The Examiner also states that *Radha* discloses a server transmitting to the client parameter information before the client estimates the buffer and delay (col.2, lines 35-42).

It is respectfully submitted that, in col.2, lines 37, *Radha* discloses:

In particular, there is a need for an improved receiver decoder buffer that takes into consideration both transport delay parameters (e.g., end-to-end delay and delay jitter) and video or audio encoder buffer constraints.

Specifically what is the parameter information that the client receives from the server before the client estimates the buffer and delay as stated by the Examiner? According to *Radha*, the receiver 130 includes a delay budget controller 138 residing in the decoder buffer 131 to monitor the level of data occupancy in the buffer 132 and to detect missing data packet (Figure 1; col.5, line 64 to col.6, line 1). The delay budget controller 138 includes a Realtime QoS characterization circuit 505 for continuously calculating and updating QoS characterization parameters using the round-trip delay, delay jitter and bandwidth (Figure 5; col.11, lines 49-52). Occasionally, assistance with the calculations for the determination of the QoS characterization parameters may be needed from streaming video transmitter 110 (col.11, lines 62-65).

Thus, *Radha* does not disclose that the transmitter 110 sends pre-decoder buffering parameters to the client. *Radha* does not disclose transmitting an aggregate of the pre-decoder buffering parameters and jitter buffer to the server, wherein the pre-decoder buffer parameters are received from the server. *Radha* only discloses that the client sends a request to the server requesting data re-transmission.

A.4 The Combined Teachings in *Harumoto*, *Colavito* and *Radha*

Regarding the information the client sends to the server:

Harumoto only discloses that the client notifies the server of a value of stream data to be stored in the receiver buffer (target value or S_target) and a time period between the time the head data of the stream data is written to the buffer to the stream data is started to be decoded or played out (delay time or T_delay);

Colavita only discloses that the client provides a frame-release threshold value to the server; and

Radha only discloses that the client sends a request to the server requesting data re-transmission.

Thus, the cited *Harumoto*, *Colavita* and *Radha* references, used individually or in combination, do not disclose or suggest transmitting to the server information indicative of an aggregate of the pre-decoding buffering parameters and the jitter buffer, wherein the pre-decoding buffering parameters are received from the server and the parameters for the jitter buffer are estimated based on the packet stream transfer delay variation indicative of a variation in time for transferring of the packet stream from the server to the client.

B. 103 Rejection of Independent Claims 1, 13, 27, 34

Claim 1 includes the limitations of estimating parameters of a jitter buffer based on the packet stream transfer delay variation; and transmitting to the server information indicative of an aggregate of the pre-decoder buffering parameters and the jitter buffer, the packet stream transfer delay variation indicative of a variation in time for transferring of the packet stream from the server to the client.

Claim 13 includes the limitations of a buffer controller for estimating packet stream transfer delay variation indicative of a variation in time for transferring of the packet stream from the server to the client and for estimating parameters of a jitter buffer based on the packet stream transfer delay variation, and a signaling engine for providing information indicative of an aggregate of the pre-decoder buffering parameters and the jitter buffer to the server.

Claim 27 includes the limitations of a signaling engine for receiving information indicative of an aggregate of the client's pre-decoder buffering parameters and a jitter buffer, wherein

parameters of the jitter buffer is estimated based on estimated packet stream transfer delay variation indicative of a variation in time for transferring of the packet stream from the server to the client.

Claim 34 includes the limitations of receiving information indicative of an aggregate of the client's buffering parameters and a jitter buffer, wherein parameters of the jitter buffer are estimated based on estimated packet stream transfer delay variation indicative of a variation in time for transferring of the packet stream from the server to the client.

The cited *Harumoto*, *Colavita* and *Radha* references, used individually or in combination, do not disclose or suggest all the limitations in independent claims 1, 13, 27 and 34. For the above reason, *Harumoto*, in view of *Colavita* and further in view of *Radha*, fails to render independent claims 1, 13, 27 and 24 obvious.

C. 103 Rejection of Dependent Claims 2, 4, 5, 7-8, 16-17, 20-22, 31, 33, 35 and 37

Regarding claims 2, 4, 5, 7-8, 16-17, 20-22, 31, 33, 35 and 37, they are dependent from claims 1, 13, 27 and 34 and include further limitations. For reasons regarding claims 1, 13, 27 and 34 above, *Harumoto*, in view of *Colavita* and further in view of *Radha*, also fails to render claims 2, 4, 5, 7-8, 16-17, 20-22, 31, 33, 35 and 37 obvious.

D. 103 Rejection of Dependent Claims 9-11, 15 and 23-25

At section 5, claims 9-11 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Harumoto*, in view of *Colavita* and *Radha*, and further in view of *Deshpande* (U.S. Patent No. 7,047,308). The Examiner cites *Deshpande* for disclosing a client and a server uses RSTP messages for communication.

At section 6, claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Harumoto*, in view of *Colavita* and *Radha*, and further in view of *Schuster et al.* (U.S. Patent No. 6,785,261, hereafter referred to as *Schuster*). The Examiner cites *Schuster* for disclosing a buffer in a decoder in VOIP network.

It is respectfully submitted that claims 9-11, 15 and 23-25 are dependent from claims 1 and 13 and include further limitations. For reasons regarding claims 1 and 13 above, claims 9-11, 15 and 23-25 are also distinguishable over the cited *Harumoto*, *Colavita*, *Radha*, *Deshpande* and *Schuster* references.

CONCLUSION

Claims 1, 2, 4, 5, 7-11, 13, 15-17, 20-25, 27, 31, 33-35 and 37 are allowable. Early allowance of all pending claims is earnestly solicited.

Respectfully submitted,

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Date: Feb. 17, 2010

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